

Bettman (B.)

## Ripening of Immature Cataracts by Direct Trituration.

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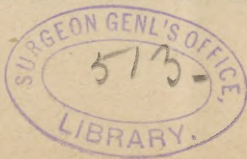
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Six years have elapsed since I first called the attention of the profession to my operation for ripening immature cataract. During this time I have had excellent opportunities to study the indications for this procedure and to note its immediate and later effects. I have made known my observations in three papers, and my main object in presenting another to-day is to call attention to a few more features and to elicit a discussion from a representative body of specialists.

The most important question, the *raison d'être* of the operation will first occupy our attention. Is the operation justifiable? Knapp in his paper on cataracts read before this section last year says: "Preliminary ripening operations are, in my opinion, almost always superfluous. I prefer the risk of extracting an unripe cataract to that of any ripening method with which I have become acquainted. The leaving of remnants behind has, in the manner in which I operate, very little to signify. Locked up in the capsule they produce no iritis, and can easily and successfully be dealt with by the secondary division of the capsule.

"I avoid operating on cataracts swollen by inhibition. They render the section difficult and rarely come out cleanly, whereas the immature cataracts,





known under the name of nuclear sclerosis, if the anterior chamber is deep mostly, not always, come out entire."

Hirschberg denounces all procedures for maturing lenses in even stronger terms. In a review of his paper, "Ueber Kernstar Ausziehung," he says: 'I operate on all senile, nuclear cataracts past the age of fifty, as soon as the vision is decidedly diminished (erheblich beschränkt), that is to say, as soon as the patient finds no pleasure in living, and is no longer able to gain a livelihood by his vocation.' Further on, he speaks of all operations for artificial ripening of the nuclear senile cataract past the age of fifty, as appearing to him not only dispensable (entbehrlich) but rather as unnecessary (unzweckmässig).

It seems to me that the opinion of these two eminent authorities voice the sentiments of opponents to artificial ripening the world over, and therefore I allude to these only.

Evidently, Dr. Knapp regards preliminary ripening as risky. I agree with him that Förster's entails the danger of setting up an iritis which, although not of a serious nature, naturally may affect owing to the posterior synechia, more or less the execution of the subsequent extraction of the lens.

That my method is absolutely safe when properly performed, has been proved by the absence of any complication attributable to the procedure. In the twenty cases thus far reported, and the three to be mentioned later on, good results were obtained after delivering the cataracts. The only danger Dr. Knapp refers to is iritis. This is obviously excluded when the iris is not mutilated or even bruised in the slightest degree.

I have long ago abandoned iridectomy, and with the introduction of my trowel shaped spatula have secured the iris against all danger of mechanical injury. Possibly the Doctor had also in mind, mis-haps to the lens and suspensory ligament, although he makes no mention of these in his article. Others

have, however, expressed themselves in this manner in personal discussion with me. As a rejoinder I can only point to my results, and again refer to the convincing argument employed in a former publication which reads as follows: "As for the second series of objections, I can only reiterate that careful and skillful manipulation of the spatula in my hands has never been followed by any untoward symptoms; seemingly the most probable misadventure would be tearing of the suspensory ligament, and dislocation of the lens. In two cases only, vitreous escaped due, however, to other causes."

I heartily agree with Dr. Knapp in ascribing the injurious effects to remnants of cortex left behind after cataract extraction, and have consequently, until lately, performed peripheric capsulotomy in every case.

Direct trituration of the lens breaks down and makes opaque the entire lens volume. Later on, when extracted, it ordinarily leaves in bulk, or if the softer cortical substance is scraped off by the corneal flaps this can be pressed out immediately after, en masse. Consequently this danger is reduced to a minimum, and induced me in the last case to lacerate the capsule more extensively; in other words to make a T-shaped capsulotomy.

In reference to Dr. Hirschberg's remarks, I must emphasize the fact that direct trituration of the lens was not intended for the so-called sclerosed cataracts. We all know that such cataracts never become thoroughly opaque, and that they can be readily removed as soon as they interfere materially with the patient's welfare. But not all patients past the age of fifty have sclerosed lenses. Furthermore, a great number are afflicted before they reach that age. An opacity of the nucleus with a few broad striæ in the periphery may disable a person, or at least make life a burden and prevent him from following his vocation.

Extractions of unripe softer forms of nuclear

cataract, where fingers are still counted at ten and fifteen feet I regard as hazardous, especially so when we possess a reliable and innocuous method, by which the transparent lens fibers can readily be broken down and their connection with the capsule loosened.

Again, the patient may possess but one eye; reduction of vision equal to one-half places him within the boundaries outlined by Prof. Hirschberg. Would the extraction of such a cataract be advisable? I have vainly endeavored to learn the exact amount of opacity of the lens which must exist before extraction of the lens is considered feasible by the adherents of early extraction. In other words, at what stage of immaturity do skillful men dare to operate?

Again, let it be understood that sclerosed lenses, such with fine striæ, or with none at all, and with a firm nucleus often of an amber color are not to be considered in this connection. Cases with incomplete opacity of the anterior cortex, permitting fingers to be counted at three, five and six feet, can no doubt be safely removed in this condition of immaturity. But I am in doubt whether the operation would be undertaken, when the lens is so unripe that not only a reflex but even a view of part of the fundus is visible. Two of the cases reported later on were of this nature.

I have made a number of experiments on rabbits, to determine in the first place the amount of pressure the lens will bear without rupturing capsule and ligament. I also intended to study with the ophthalmoscope and later on with the microscope, the changes thus evoked in the lens. My rabbit house was lately burglarized by street urchins and every bunny, nine in all, was carried off. Two others succumbed to injuries caused by a blow on the back and one more escaped. My investigations have, for the present at least, been brought to an untimely end.

A few facts have been gleaned which may prove interesting: nine of the animals were young, per-



haps five or six weeks old, three had reached the age of one year and were almost fully grown. In ten eyes I introduced the spatula, after having chloroformed the animals, and made a corneal incision with a lance and subjected the lens to violent trituration. The pressure I exerted was quite uniform, but rather severe, far more so than I would dare attempt in the human eye. In some cases I wounded the iris with a knife, in others a prolapsus of the iris followed which I did not attempt to reduce. The eyes were cleansed with a bichlorid solution and no farther attention bestowed on them. In nearly all, a decided opacity of the posterior cortex was visible the next day. In a few it extended to the body of the lens and then to the anterior cortex a day or two later. In the majority of cases the bulk of the lens cleared up within ten days. In two, not a trace of any abnormal condition could be seen and in the remainder more or less striæ were still visible weeks after direct trituration. Secondary reaction ensued in a few, in those having prolapsed irides, but disappeared in a few days. These incomplete experiments indicate that normal lenses of young rabbits will stand very severe trituration without rupturing the capsule or suspensory ligament. They also indicate that changes (directly attributable to the massage) of a more or less permanent nature will appear in the normal lens.

If similar experiments, with similar results, were undertaken on old rabbits showing senile changes, we could then draw more conclusive deductions regarding the immunity from danger of the senile capsule and suspensory ligament following massage of the lens.

The cases I will now report were nuclear cataracts with broad striæ in the anterior cortex. Two were senile, the other, that of a young man, cortical with a very small nucleus. In all, a marked reflex from the fundus was obtainable; in the young man, a dim view of the lower part of the fundus could be

seen. None of these cataracts were ready for extraction, and I have grave doubts whether the gentlemen who advocate the removal of immature lenses would have considered them sufficiently advanced.

*Case 1.*—Theo. T., aged 68; admitted into the Eye and Ear Infirmary, Oct. 24, 1892. Senile cataract both eyes. R. E. mature three years. History of amblyopia. Simple extraction, October 27. November 17. Secondary capsulotomy  $V=20-200$  with  $+10$ . An ophthalmoscopic examination revealed choroidal changes. L. E., immature cataract of six months duration. Could see enough to walk about the streets but not sufficiently to perform work on farm. A dim reflex from fundus was obtainable. My fingers were readily counted at eight feet. It was only after long persuasion that he allowed me to triturate the lens December 1. He left the infirmary December 6, with instructions to return as soon as sight failed entirely in that eye. He returned December 21, stating that for the week past he had not been able to count fingers. The entire lens was opaque. No iris shadow was seen. He was only able to indicate the direction of the moving hand.

I did a simple extraction the following day, December 22, and a secondary capsulotomy Jan. 11, 1893, which resulted in  $V=20-40$  with  $+10$ . Slight choroidal changes were found in this eye also.

*Case 2.*—Alex. F., aged 50; admitted Feb. 19, 1893. Immature cataract of both eyes. R. E.,  $V=20-200$ . L. E., nuclear cataract. Broad striæ in upper and outer part of cortex; lower and inner parts much clearer, permitting a dim view of fundus.  $V$ =fingers at six feet. I did direct trituration Feb. 9, 1893. The lens soon became opaque March 7, the cataract being entirely mature and vision reduced to qualitative perception of light. I did a simple extraction and later on March 16, needled. He was discharged a few days later with  $V=20-20$  with  $+11 D \subset +1$  decy axis  $180^\circ$ .

*Case 3.*—Martin DeYoung, aged 34; admitted Jan. 3, 1893. L. E., mature soft cataract, white small nucleus plainly outlined; had not been able to see during past four years. R. E., immature, small opaque nucleus. Broad striæ running from equator toward center, leaving clear space between, through which blood vessels in the fundus could be distinctly outlined. Simple extraction was done on the left eye January 15. Secondary capsulotomy January 26.  $V=20-20$  with  $+12 D$ . The left lens was triturated March 25. The condition of the cataract was as indicated above. Fingers were counted at five feet. A few days later the entire anterior cortex had assumed a fine satin-like appearance distinctly visible by oblique illumination. A month later



the entire cortex had assumed almost a uniform white appearance, allowing the small, yellowish white nucleus to shine through. April 25, I performed a simple extraction. The corneal incision was made throughout in the cornea. The capsule lacerated in several directions. The small thin nucleus was expelled with a mass of opaque cortex clinging to it; the remainder of the soft, cohesive cortical substance was readily pressed out with the spoon leaving a clear black pupil. The eye made a rapid recovery with a slight anterior synechia at the inner edge of the wound. The patient was discharged soon after with V=20-30 with +12 D. I saw him a week ago; a few shreds of torn capsule surrounded the clear pupil. His vision was the same.

In conclusion, I will formulate the result of my six years experience:

1. Artificial ripening of cataracts is in properly selected cases demanded; 2, direct trituration is preferable to other methods; it is easily performed by one possessing ordinary skill; 3, it is not followed by any untoward symptoms, consequently it is a safe and reliable procedure; 4, it is not indicated where sclerosis involves the bulk of the lens; 5, it is especially useful in senile cataracts with soft cortex; 6, the results of the massage are marked and rapid; 7, maturity of the cataract is usually induced in three weeks, often sooner; 8, very little discomfort is caused the patient aside from bandaging the eye two days; 9, at the subsequent extraction of the lens, the cortical substance is readily removed and dangers of iritis and suppuration of the corneal wounds are lessened.







